Introduction

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For thousands of years, humans have recognized that plants can influence their lives, useful as human food, feed for animals, culinary utensils, clothing, paper, fuel and drugs for treatment of a variety of human ailments. Knowledge about the practical uses of plants for these and other uses dates back to thousands of years ago. Indeed, Egyptian and Assyrian civilizations from more than 4000 BCE (before current era) possessed and recorded detailed knowledge about plant life and uses (Blunt and Raphael, 1980; Wright, 1938).

Many observations were made and much practical knowledge was gained through trial and error by these early people; although, most botanists acknowledge the beginnings of true plant science to have occurred during the Golden Age of Greece. Early Greek botanists were physicians and purveyors of drugs, who studied variations in plant form and function, relationships among plants, and paid particular attention to agricultural uses and the healing properties of plants. Early herbals often portrayed fanciful illustrations of the relationships between plants and animals and often ascribed human characteristics to plants (Figs. 1 and 2) (Fuller and Tippo, 1954). Although some of these may seem humorous in light of today's botanical and horticultural knowledge, much basic information and insights can be attributed to these early botanists.

Fig. 1. A fanciful illustration from an old herbal of a mandrake plant (*Mandragora officinarum*).

Theophrastus, a student of Plato and Aristotle, wrote the herbal *History of Plants* around 340 BCE. In it he described over 500 food and medicinal plants, including accurate depictions of the form and numerous other properties of these plants. In another book, *The Causes of Plants*, Theophrastus also discussed a wide range of plant characteristics, including flavors and perfumes, effects of weather and temperature extremes on plants, seeds, death of plants and even grafting methods (Janick, 1989; Fuller and

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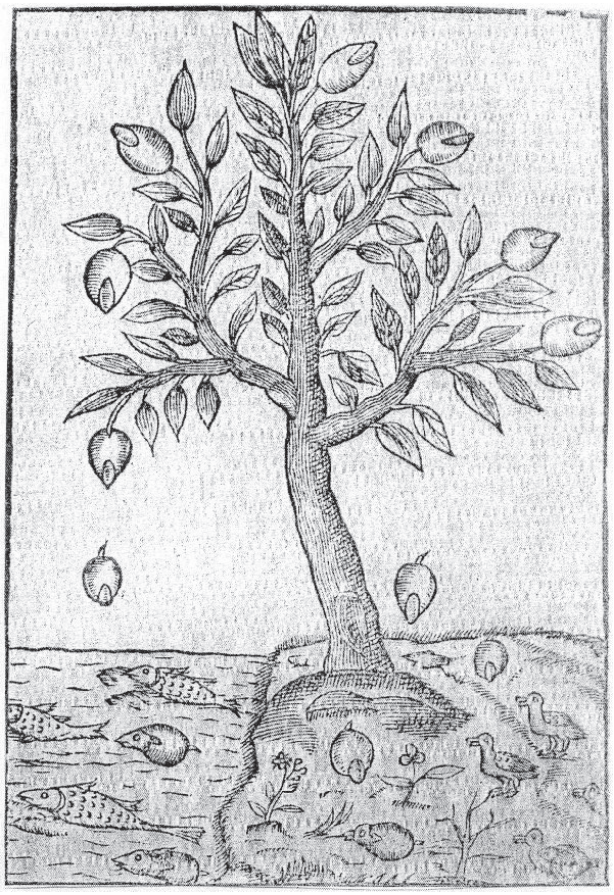
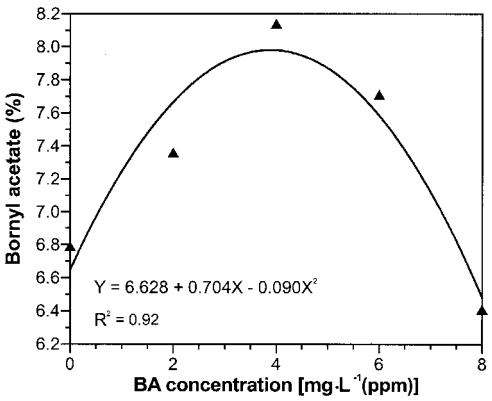


Fig. 2. In this illustration from an ancient herbal, the tree is depicted as shedding leaves into the water to turn into fish and onto land where they become birds.

Tippo, 1954). A later Greek scientist, Dioscorides, wrote a book about medicinal plants that provided a compilation of medicinal uses of plants, but also presented some very progressive ideas and observations about relationships among plant groups that we now regard as plant families [e.g., mints (Lamiaceae) composites (Asteraceae) and legumes (Fabaceae)](Gunther, 1934). Perhaps the best-known Roman botanist was Pliny the Elder, who described nearly 1000 plants, many of which were considered medicinal plants, although his *Natural History of Plants* is so replete with errors that it is of less value to today's scientists than the works of the aforementioned Greek scholars.

Following a dearth of scientific study during the Middle Ages, sixteenth and seventeenth century botanists again pursued the scientific progress made by Theophrastus and others so many years earlier. Botanical gardens became fashionable during this later period and the writing of herbals flourished. These writings were often very lengthy and heavily illustrated (Figs. 1 and 2), containing descriptions of plant characteristics and again focusing on their medicinal uses. Among the many outstanding authors of these herbals were Otto Brunfels, Hieronymus Bock, Leonard Fuchs and Gaspard Baukin. Fuchs was well-known for his excellent woodcut illustrations, Bock for describing plants in their natural state and Baukin for publishing descriptions of almost 6000 plants in 1623 (Blunt and Raphael, 1980; Tyler, 1981).

Modification of the value of fruit, vegetables and their



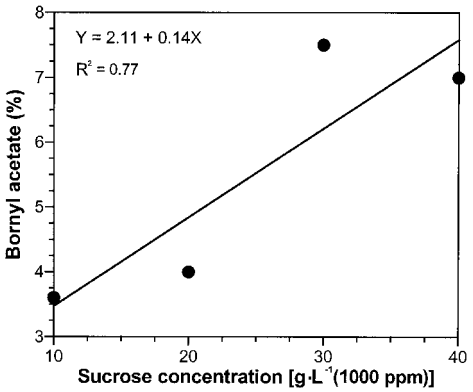


Fig. 3. Effect of benzyladenine (top) and sucrose (bottom) in the regeneration medium on bornyl acetate level of regenerant plants of 'Prostratus' rosemary produced in vitro on Murashige and Skoog medium.

products to enhance their benefits to human health continues to be a goal of many plant breeders and other plant scientists. Production of foods, supplements, secondary products, and medicines in vitro has also been a topic for research and discussion in recent decades. As an example, research in our laboratory has shown that the components of plant tissues grown in vitro can be influenced by culture methods and treatments, as illustrated in Fig. 3 (Tawfik, 1992).

The potential for plant scientists to use such techniques along with conventional plant breeding and biotechnological approaches offers much promise for enhancing human health in the ensuing years.

As the modern era of botany and horticulture progresses, the importance of plants and plant products as medicines and food continues to be emphasized. In addition to an in-depth discussion of the historical aspects (Janick, 2003), this workshop will address plants and plant products as dietary supplements (Craker and Gardner, 2003), plants and their products as the entire diet (Palaniswamy, 2003) and the healthful value of plants and plant products for human nutrition (Goldman, 2003).

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